

## 780 CMR 3603

### BUILDING PLANNING

*(This Section is unique to Massachusetts.)*

#### 780 CMR 3603.1 STRUCTURAL DESIGN CRITERIA

**3603.1.1 Design:** Buildings and structures, and all parts thereof, regulated by 780 CMR 36, shall be constructed to support safely all applied dead, live and environmental loads specified in 780 CMR 3603.1.

**Exception:** One and Two Family Dwellings are exempt from the earthquake load requirements of 780 CMR 1612.

**3603.1.2 Dead load:** The actual weights of materials and construction shall be used for determining dead load with consideration for the dead load of fixed service equipment.

**3603.1.3 Live load:** The minimum uniformly distributed live load shall be as specified in Table 3603.1.3. Elevated garage floors shall be designed to support a 2,000 pound (8.90 kN) concentrated load applied over a 20 square inch (0.0129 m<sup>2</sup>) area, in addition to the loads specified in table 3603.1.3.

**3603.1.4 Roof Live Load:** Roofs shall be designed to support the live load specified in Table 3603.1.4, or the snow load specified in 780 CMR 3603.1.5, whichever is greater.

**3603.1.5 Basic snow load:** Figures 3603.1.5a, 3603.1.5b, 3603.1.5c and 3603.1.5d define four snow load zones. The basic snow load for each zone shall be applied to the horizontal projection of sloped or flat roofs and unenclosed floor areas, as a uniformly distributed load,  $P_f$ , in pounds per square foot, as specified in Table 3603.1.5.

**3603.1.6 Deflection:** The allowable deflection of any structural member under the live load or snow load listed in 780 CMR 3603.1.3, 3603.1.4 and 3603.1.5 shall not exceed the values in Table 3603.1.6.

**Table 3603.1.3**  
**MINIMUM UNIFORMLY DISTRIBUTED**  
**LIVE LOADS**  
**(POUNDS PER SQUARE FOOT)**

USE	LIVE LOAD (psf)
Balconies and decks	60
Garages (passenger cars only)	50 <sup>(1)</sup>
Attics (roof slope not steeper than 3 in 12 - no storage)	10
Attics (limited storage)	20
Living Areas (except sleeping rooms)	40
Sleeping Rooms	30
Stairs	40 <sup>(2)</sup>
Guardrails and Handrails (single concentrated load at any point along the top)	200

Notes:

(1) See also 780 CMR 3603.1.3

(2) In addition to the uniformly distributed live load, individual stair treads shall be designed for a single concentrated load of 300 pounds over an area of four square inches.

**Table 3603.1.4**  
**MINIMUM ROOF LIVE LOAD**  
**(POUNDS PER SQUARE FOOT OF**  
**HORIZONTAL PROJECTION)**

ROOF SLOPE	TRIBUTARY LOADED AREA (square feet) for any structural member		
	0 to 200 sf	201sf to 600 sf	Over 600 sf

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Flat, or rise less than 4 inches per foot	20	16	12
Rise 4 inches per foot to less than 12 inches per foot	16	14	12
Rise 12 inches per foot or greater	12	12	12

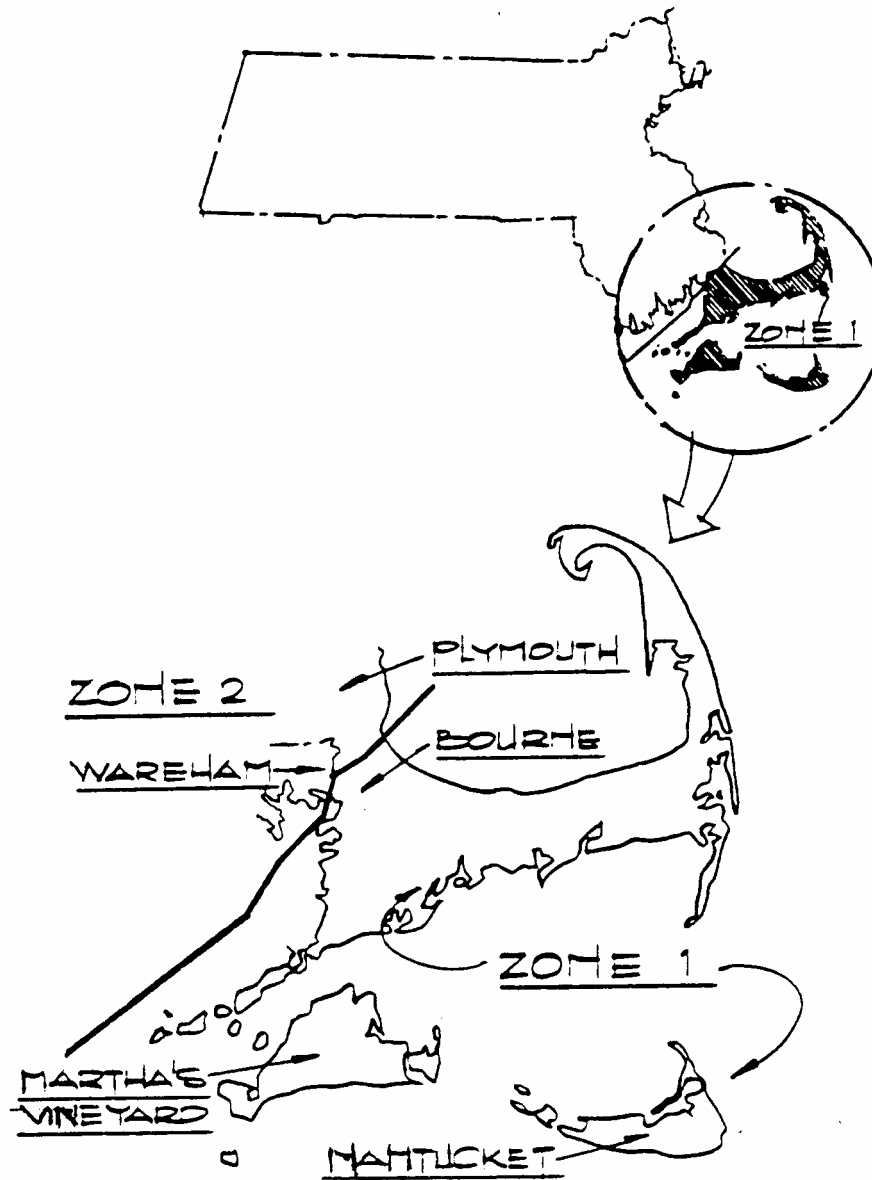
**Table 3603.1.5****BASIC SNOW LOAD,  $P_f$** 

<b>SNOW LOAD ZONE <sup>1</sup></b>	<b>BASIC SNOW LOAD <math>P_f</math></b>
1	25 psf
2	30 psf
3	35 psf
4	40 psf

**Notes:**

1. See figures 3603.1.5 a through d

**Figure 3603.1.5a**  
**MINIMUM UNIFORM SNOW LOAD MAP**  
**ZONE 1**



List of Towns in Minimum Uniform  
Snow Load Zones Zone 1

Barnstable	Gay Head	Sandwich
Bourne	Gosnold	
Brewster		Tisbury
	Harwich	Truro
Chatham		
Chilmark	Mashpee	Vineyard Haven

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**Dennis**

**Nantucket**

**Wellfleet**  
**West Tisbury**

**Eastham**  
**Edgartown**

**Oak Bluffs**  
**Orleans**

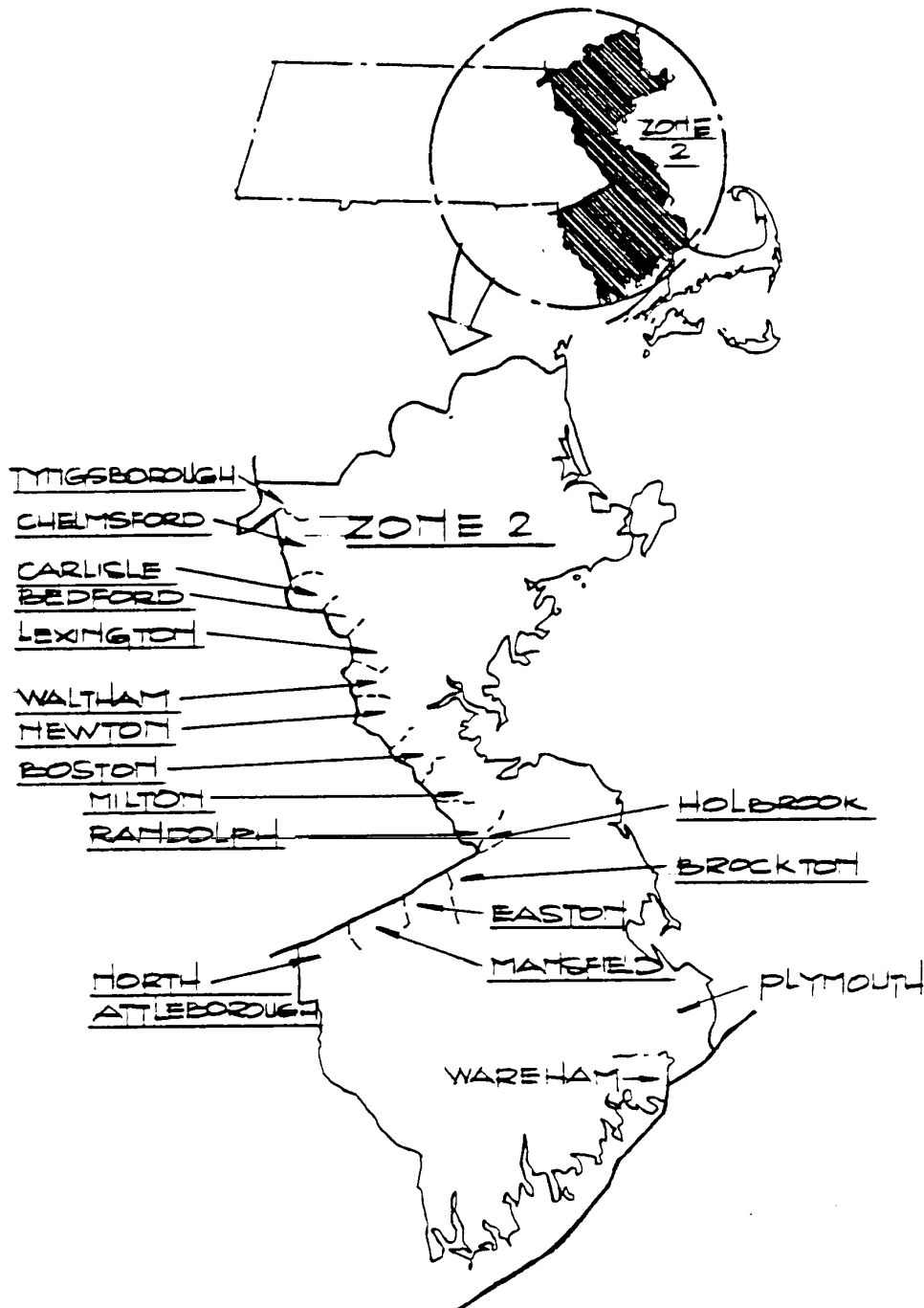
**Yarmouth**

**Falmouth**

**Provincetown**

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**Figure 3603.1.5b**  
**MINIMUM UNIFORM SNOW LOAD MAP**  
**ZONE 2**



List of Towns in Minimum Uniform  
Snow Load Zones Zone 2

Abington	Cambridge	Freetown	Lawrence	Milton	Randolph	Taunton
Acushnet	Carlisle		Lexington		Raynham	Tewksbury
Amesbury	Carver	Georgetown	Lowell	Nahant	Reading	Topsfield
Andover	Chelmsford	Gloucester	Lynn	New Bedford	Rehoboth	Tyngsborough

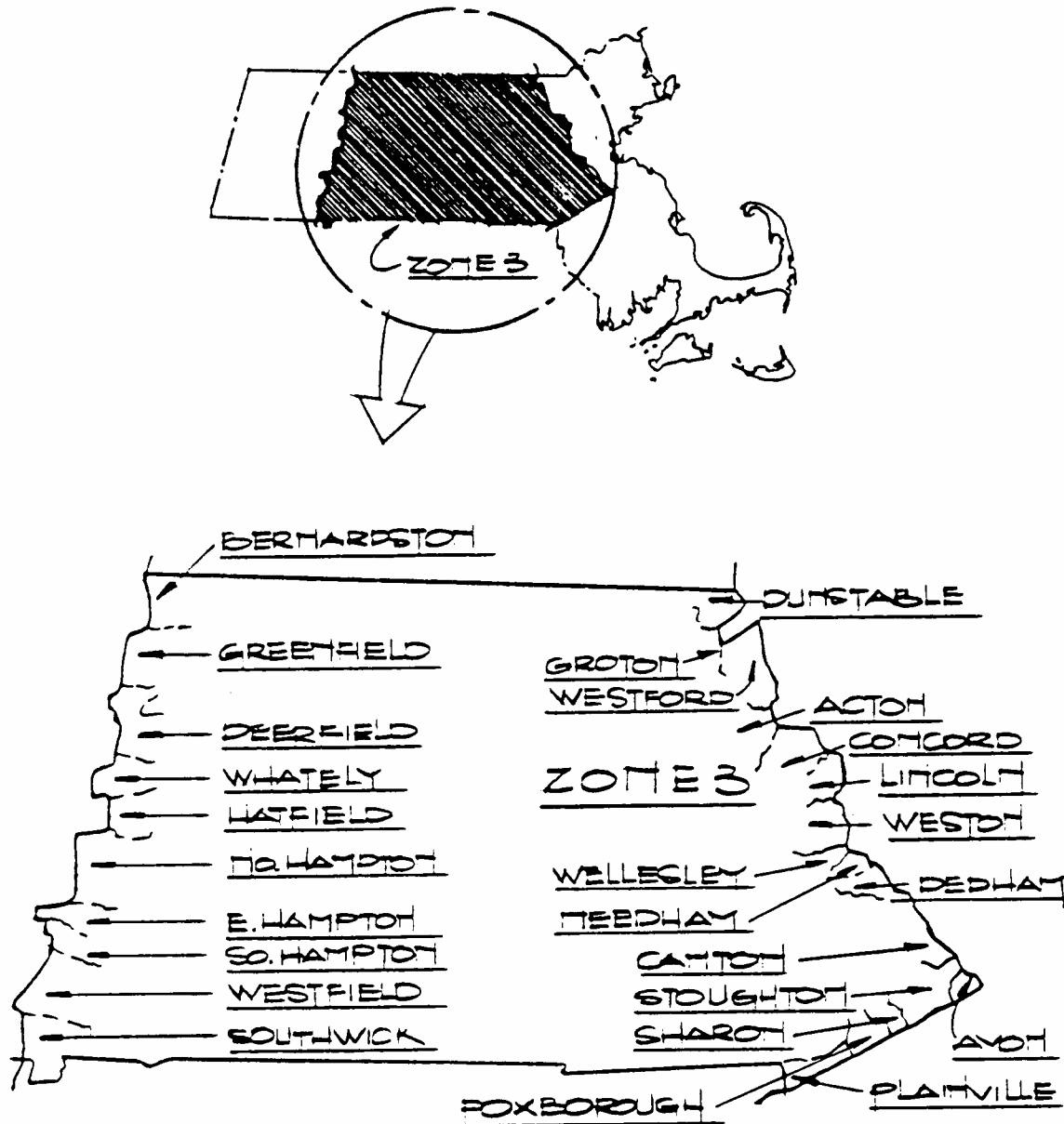
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Arlington	Chelsea	Groveland	Lynnfield	Newbury	Revere	
Attleboro	Cohasset			Newburyport	Rochester	Wakefield
		Halifax		Newton	Rockland	Waltham
Bedford	Danvers	Hamilton	Malden	N. Andover	Rockport	Wareham
Belmont	Dartmouth	Hanover	Manchester	N. Attleboro	Rowley	Watertown
Berkley	Dighton	Hanson	Mansfield	N. Reading		Wenham
Beverly	Dracut	Haverhill	Marblehead	Norton	Salem	W. Bridgewater
Billerica	Duxbury	Hingham	Marion	Norwell	Salisbury	W. Newbury
Boston		Holbrook	Marshfield		Saugus	Westport
Boxford	E. Bridgewater	Hull	Mattapoisett	Peabody	Scituate	Weymouth
Braintree	Easton		Medford	Pembroke	Seekonk	Whitman
Bridgewater	Essex	Ipswich	Melrose	Plymouth	Somerset	Wilmington
Brockton	Everett		Merrimac	Plympton	Somerville	Winchester
Brookline		Kingston	Methuen		Stoneham	Winthrop
Burlington	Fairhaven		Middleborough	Quincy	Swampscott	Woburn
	Fall River	Lakeville	Middleton		Swansea	

**Figure 3603.1.5c**  
**MINIMUM UNIFORM SNOW LOAD MAP**  
**ZONE 3**

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List of Towns in Minimum Uniform  
Snow Load Zones Zone 3

Acton	Chicopee	Greenfield	Lunenburg	Oakham	Sunderland	Wendell
Agawam	Clinton	Groton		Orange	Sutton	West Boylston
Amherst	Concord		Marlborough	Oxford	Sharon	West Brookfield
Ashburnham		<b>Hadley</b>	Maynard		Sherborn	W. Springfield
Ashby	<b>Dedham</b>	Hampden	Medfield	<b>Palmer</b>	Shirley	Westborough
Ashland	Deerfield	Hardwick	Millbury	Paxton	Shrewsbury	Westfield
Athol	Douglas	Harvard	Millville	Pelham	Shutesbury	Westford
Auburn	Dover	Hatfield	Medway	Pepperell	S. Hadley	Westminster
Avon	Dudley	Holland	Mendon	Petersham	Southampton	Weston
Ayer	Dunstable	Holliston	Milford	Phillipston	Southborough	Westwood

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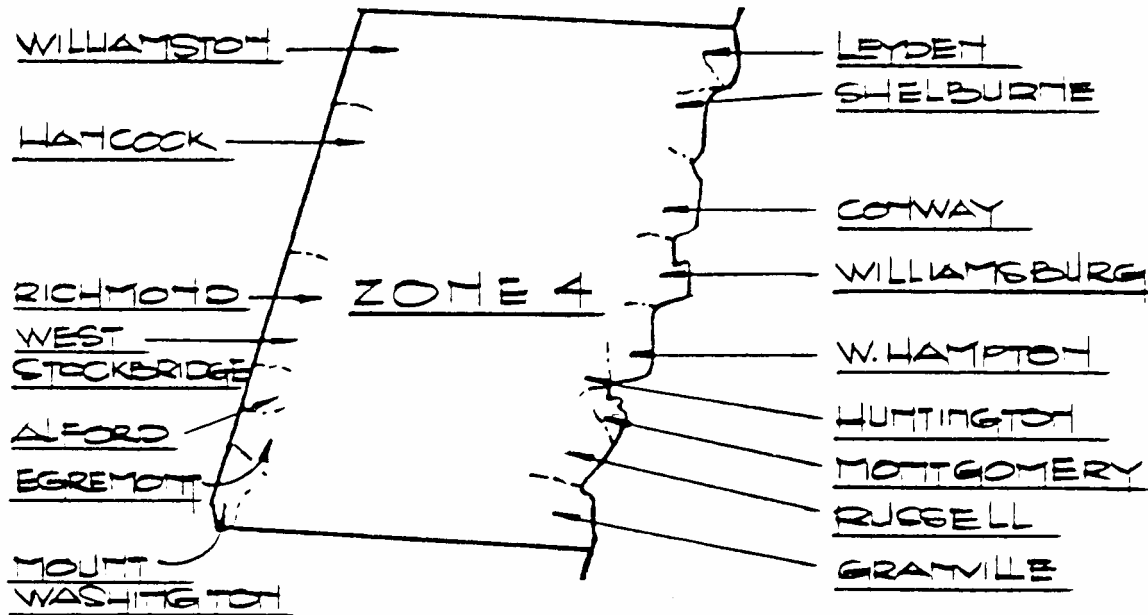
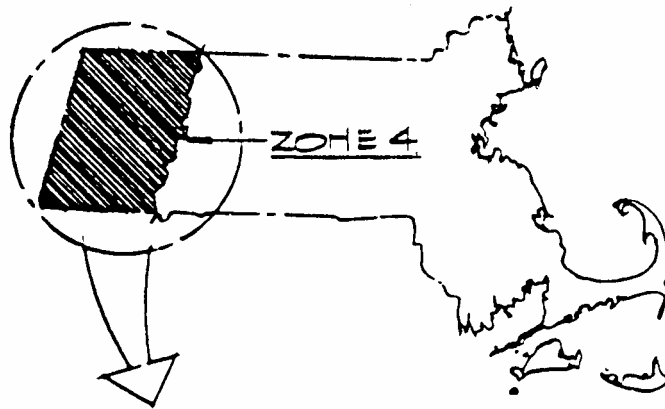
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<b>Barre</b>	<b>E. Brookfield</b>	Holden	Millis	Plainville		Wilbraham
Belchertown	Easthampton	Holyoke	Monson	Princeton	<b>Templeton</b>	Winchendon
Bellingham	E. Longmeadow	Hopedale	Montague		Townsend	Whately
Berlin	Erving	Hopkinton		<b>Royalston</b>		Worcester
Bernardston		Hubbardston	Natick	Rutland	<b>Upton</b>	Wrentham
Blackstone	<b>Fitchburg</b>	Hudson	Needham		Uxbridge	
Bolton	Foxborough		New Braintree	<b>Southbridge</b>		
Boylston	Framingham	<b>Lancaster</b>	New Salem	Southwick	<b>Wales</b>	
Boxborough	Franklin	Leicester	Norfolk	Spencer	Walpole	
Brimfield		Leominster	North Brookfield	Springfield	Ware	
Brookfield	<b>Gardner</b>	Leverett	Northampton	Sterling	Warren	
	Gill	Lincoln	Northborough	Stoughton	Warwick	
<b>Canton</b>	Grafton	Littleton	Northbridge	Stow	Wayland	
Charlton	Granby	Longmeadow	Northfield	Sturbridge	Webster	
		Ludlow	Norwood	Sudbury	Wellesley	

**Figure 3603.1.5d**  
**MINIMUM UNIFORM SNOW LOAD MAP**  
**ZONE 4**



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List of Towns in Minimum Uniform  
Snow Load Zones Zone 4

Adams	Colrain	Hancock	Monterey	Plainfield	Tolland
Alford	Conway	Hawley	Montgomery		Tyringham
Ashfield	Cummington	Heath	Mount Washington	Richmond	
		Hinsdale		Rowe	Washington
Becket	Dalton	Huntington	New Ashford	Russell	W. Stockbridge
Blandford			New Marlborough		Westhampton
Buckland	Egremont	Lanesborough		Sandisfield	Williamsburgh
		Lee	North Adams	Savoy	Williamstown
Charlemont	Florida	Lenox		Sheffield	Windsor
Cheshire		Leyden	Otis	Shelbourne	Worthington
Chester	Goshen			Stockbridge	

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Chesterfield	Granville	<b>M</b> iddlefield	<b>P</b> eru
Clarksburg	Great Barrington	Monroe	Pittsfield

**Table 3603.1.6**  
**ALLOWABLE LIVE LOAD DEFLECTION**  
**OF STRUCTURAL MEMBERS**

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3 in 12 -no finished ceiling attached to rafters	L/180
Interior walls and partitions	H/180
Floors and veneer plastered ceilings	L/360
Gypsum panel ceilings and all other structural members	L/240

Notes:

L = Span length; H = Span height

### **780 CMR 3603.2** **CONSTRUCTION IN AREAS SUBJECT** **TO FLOODING**

**3603.2.1 Flood Resistant Construction:** Construction in areas designated as subject to flooding on the community Flood Insurance Rate Map (FIRM) shall be designed and constructed in accordance with the applicable provisions of 780 CMR 3107.

### **780 CMR 3603.3** **FIRERESISTANCE** **RATING** **OF EXTERIOR WALLS**

**3603.3.1 Exterior walls:** Exterior walls located less than three feet (0.914m) from property lines shall have a minimum of one-hour fire-resistive rating. The fire-resistive rating of exterior walls located less than three feet (0.914 m) from a property line shall be rated for exposure from both sides. Projections beyond the exterior wall shall not extend more than 12 inches (0.305 m) into areas where openings are prohibited.

**3603.3.2 Openings:** Openings shall not be permitted in exterior walls of dwellings located less than three feet (914 mm) from the property line. This distance shall be measured perpendicular to the vertical plane of the wall.

### **780 CMR 3603.4 DWELLING UNIT** **SEPARATION**

**3603.4.1 Two-family dwellings:** Dwelling units in two-family dwellings shall be separated by wall and/or floor-ceiling assemblies of not less than one-hour fire-resistive rating when tested in accordance with ASTM E 119, as listed in *Appendix A*. Fire-resistive-rated floor-ceiling and wall assemblies shall extend to, and be tight against, the exterior wall and wall assemblies shall extend to the underside of the roof sheathing.

**3603.4.2 Supporting construction:** When floor assemblies are required to be fire-resistive rated by 780 CMR 3603.4.1, the supporting construction of such assemblies shall have an equal or greater fire-resistive rating.

**3603.4.3 Sound transmission:** Wall and floor-ceiling assemblies separating dwelling units shall provide airborne sound insulation for walls and both airborne and impact sound insulation for floor-ceiling assemblies.

**3603.4.3.1 Airborne noise:** Airborne sound insulation for wall and floor-ceiling assemblies shall meet a Sound Transmission Class (STC) of 45 when tested in accordance with ASTM E 90.

**3603.4.3.2 Penetrations:** Penetrations or openings in the assembly for pipes, ventilation or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings.

**3603.4.3.3 Structural-borne noise:** Impact sound insulation for floor-ceiling assemblies shall meet an Impact Insulation Class (IIC) of 45 when tested in accordance with ASTM E 492. Floor covering may be included in the assembly to obtain the required rating.

### **780 CMR 3603.5 GARAGE SEPARATION**

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**3603.5.1 Opening protection:** Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and dwelling shall be equipped with either solid wood doors not less than 1¾ inch (45 mm) in thickness or 20-minute fire-rated doors. Self closing devices and fire resistive rated door frames are not required. All door openings between the garage and the dwelling shall be provided with a raised sill with a minimum height of four inches.

**3603.5.2 Fire Separation:** The garage shall be separated from the residence and its attic area by means of minimum ½ inch (16 mm) type X gypsum board applied to the garage side. Wherever the attic area is continuous between the garage and the dwelling a firestop of ½ inch (16 mm) type X gypsum board with a minimum of one coat compound and tape shall be used to form a barrier to separate the garage and dwelling.

**Exception 1:** Every bathroom and toilet room shall, as a minimum, be provided with artificial light.

**Exception 2:** All interior and exterior stairways shall be provided with artificial light providing direct or indirect illumination and capable of illuminating the entire length of the stairway and associated landings. The control for activation of the required interior stairway lighting shall be installed in accordance with the requirements of 527 CMR 12.00, the Massachusetts State Electrical Code, as listed in *Appendix A*. The illumination of exterior stairs shall be controlled from inside the dwelling

**3603.6.2 Ventilation required:** Every room or space intended for human occupancy shall be provided with natural or mechanical ventilation.

**Exception:** Every bathroom and toilet room shall be equipped with a mechanical exhaust fan and associated ductwork with the fan exhausting, as a minimum, at 50 cfm if operated intermittently or 20 cfm if continuously operated. Such bathroom

**3603.5.3 Floor surface:** Garage and carport floor surfaces shall be constructed of concrete or other approved noncombustible material. Slab on grade construction shall be in accordance with the provisions of 780 CMR 3605.5. The minimum floor thickness shall be 3½ inches. The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate drainage toward the main vehicle entry/exit doorway.

## 780 CMR 3603.6 LIGHT, VENTILATION AND HEATING

**3603.6.1 Light required:** Every room or space intended for human occupancy shall be provided with natural or artificial light.

exhaust shall vent directly to the outside and no exhaust vent termination to attics or other interior portions of the building are allowed.

**3603.6.3 Heating required:** One and two family dwellings shall be designed with heating systems complying with the requirements of 780 CMR 3603.21.

### 3603.6.4 Natural light

**3603.6.4.1 General:** Should natural lighting be chosen as a lighting option, in the application of the provisions of 780 CMR 3603.0 for habitable and occupiable rooms, unless otherwise specifically required by the provisions of 780 CMR 4 for special occupancies, the requirements of 780 CMR 3603.6.4.2 through 780 CMR 3603.6.4.6 shall apply.

**3603.6.4.2 Minimum glazing area:** Every room or space intended for human occupancy shall have an exterior glazing area of not less than 8% of the floor area. ½ of the required area of glazing shall be openable. Glazed openings shall be located such

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that they open directly onto a street or public alley, or a yard or court, or other open space located on the same lot as the building. Glazed openings are permitted to face into a roofed porch where the porch abuts a street, yard or court, or other open area and the longer side of the porch is at least 65% open and unobstructed and the ceiling height of the porch is not less than seven feet (2134 mm).

**Exceptions:**

1. Glazed areas need not be openable where the opening is not required by 780 CMR 3603.10.4 and an approved mechanical ventilation system is provided which is capable of producing 0.35 air change per hour in the room or a whole-house mechanical ventilation system is installed capable of supplying outdoor ventilation air of 15 cubic feet per minute (cfm) (7.08 L/s) per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom.
2. The glazed areas may be omitted in rooms where the opening is not required by 780 CMR 3603.10.4 and an approved mechanical ventilation system is provided capable of producing 0.35 air change per hour in the room or a whole-house mechanical ventilation system is installed capable of supplying outdoor ventilation air of 15 cfm (7.08 L/s) per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom, and artificial light is provided capable of producing an average illumination of six foot-candles (6.46 lx) over the area of the room at a height of 30 inches (762 mm) above the floor level.

**3603.6.4.3 Adjoining spaces:** Where natural light for rooms or spaces without exterior glazing areas is provided through an adjoining room, the unobstructed opening to the adjoining room shall be at least 8% of the floor area of the interior room or space, but not less than 25 square feet

(2.33 m<sup>2</sup>). The exterior glazing area shall be based on the total floor area being served.

**3603.6.4.4 Stairways:** See 780 CMR 3603.6.1, Exception 2

**3603.6.4.5 Hallways:** Natural light shall be capable of penetrating the full length of the hallway.

**3603.6.4.6 Bathrooms and toilet rooms:** See 780 CMR 3603.6.1, Exception 1.

**3603.6.5 Artificial light**

**3603.6.5.1 General:** Artificial light shall be capable of providing the minimum illumination considered safe for the specific space application (an average illumination of six foot candles over the area of a room at a height of 30 inches above the floor is typically considered acceptable except for bathrooms and toilet rooms where three foot-candles, so measured is typically considered acceptable).

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**3603.6.6 Natural ventilation**

**3603.6.6.1 General:** Natural ventilation of an occupied space shall be provided by means of windows, doors, louvers or other natural openings to the outdoor air.

**3603.6.6.2 Ventilation area required:** The minimum openable area to the outdoors shall be 4% of the floor area being ventilated.

**3603.6.6.2.1 Adjoining spaces:** Where rooms and spaces without openings to the outdoors are ventilated through an adjoining room, the unobstructed opening to the adjoining room shall be at least 8% of the floor area of the interior room or space, but not less than 25 square feet (2.33 m<sup>2</sup>). The ventilation openings to the outdoors shall be based on the total floor area being ventilated.

**3603.6.6.2.2 Bathrooms and toilet rooms:** See 780 CMR 3603.6.2, Exception.

**3603.6.6.2.3 Openings below grade:** Openings below grade shall be acceptable for natural ventilation provided that the outside horizontal clear space measured perpendicular to the opening is 1½ times the depth below the average adjoining grade.

**3603.6.6.3 Openings onto yards, courts or open areas:** Natural ventilation shall be provided by openings onto yards, courts or other open space on the same lot.

**3603.6.7 Mechanical ventilation**

**3603.6.7.1 General:** Mechanical ventilation shall conform to the requirements of 780 CMR 36 and otherwise to the requirements of the BOCA National Mechanical Code listed in *Appendix A*.

**3603.6.8 Ventilation of special spaces**

**3603.6.8.1 Roof spaces:** Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, shall have cross ventilation for each separate space by ventilation openings that are protected against the entrance of rain and snow. The openings shall be covered with corrosion-resistant mesh not less than ¼ inch (6 mm) nor more than ½ inch (13 mm) in any direction, or other approved screening which allows for ventilation.

**3603.6.8.1.1 Ventilating area:** The minimum required net free ventilating area for such roof spaces shall be  $\frac{1}{150}$  of the area of the space ventilated, except that the minimum required area shall be reduced to  $\frac{1}{300}$ , provided that: a vapor retarder having a permeance not exceeding one perm is installed on the warm side of the ceiling; or at least 50% and not more than 80%, of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least three feet (914 mm) above eave or cornice vents, with the balance of the required ventilation provided by eave or cornice vents.

**3603.6.8.2 Basements, cellars and crawl spaces:** All basements, cellars which are not used as *habitable, occupiable* space, and crawl spaces, shall be ventilated by openings in exterior foundation walls, by openable windows or by approved mechanical means. Openings or openable windows shall be located as near as practical to provide cross ventilation. The openings shall be covered with corrosion resistant mesh not less than ¼ inch (6 mm) nor more than ½ inch (13 mm) in any direction, or other approved screening which allows for ventilation except than when openable windows are used for basement or cellar ventilation, standard window screens may be used as the corrosion resistant mesh.

**Note:** Crawl spaces shall not be used as an underfloor plenum.

**Exception:**

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1. Basements or cellars used as *habitable, occupiable space* (Typically basements and cellars are not classified as habitable, occupiable space - see Definitions, 780 CMR 2 and 1202) shall satisfy the ventilation requirements of 780 CMR 3603.6.6 or 780 CMR 3603.6.7, as applicable.

2. All basements and cellars containing solid fuel fired or fossil fired appliances shall additionally satisfy combustion air requirements of 780 CMR 3611.1

vents are provided, they shall have manually operable louvers.

**Exception:** Basements and cellars not used as habitable, occupiable space shall be provided with a minimum of four sliding type, or awning type basement windows for every 1500 square feet of floor area, or multiples thereof, and shall be located, as near as practical, to provide cross ventilation.

**3603.6.8.2.1 Opening size:** Openings or openable windows shall have a net area of not less than one square foot ( $0.093 \text{ m}^2$ ) for each 150 square feet ( $13.95 \text{ m}^2$ ) of foundation floor area. Where an approved vapor retarder is installed over the ground surface, the required net area of openings shall be reduced to 0.1 square foot ( $0.093 \text{ m}^2$ ) for each 150 square feet ( $13.95 \text{ m}^2$ ) and where

#### 780 CMR 3603.7 ROOM DIMENSIONS

**3603.7.1 Floor area:** Habitable rooms, except kitchens, shall have an area of not less than 70 square feet ( $6.51 \text{ m}^2$ ). Every kitchen shall have not less than 50 square feet ( $4.64 \text{ m}^2$ ). Habitable rooms, except kitchens shall not be less than seven feet (2134 mm) in any horizontal direction.

#### 780 CMR 3603.8 CEILING HEIGHT REQUIREMENTS

**3603.8.1 Minimum ceiling height:** *Habitable rooms*, except kitchens, shall have a ceiling height of not less than seven feet three inches (2210 mm) for at least 50% of their required areas. Not more than 50% of the required area may have a sloped ceiling less than seven feet three inches (2210 mm) in height with no portion of the required areas less than five feet (1524 mm) in height. If any room has a *furred ceiling*, the prescribed ceiling height is required for at least 50% of the area thereof, but in no case shall the height of the *furred ceiling* be less than seven feet (2134 mm).

**3603.6.8.3 Alternative mechanical ventilation:** Enclosed attics, rafter, basement, cellar and crawl spaces which are not ventilated as herein required shall be equipped with a mechanical ventilation system conforming to the requirements of the BOCA National Mechanical Code listed in *Appendix A*.

#### Exceptions:

1. Beams and girders spaced not less than four feet (1219 mm) on center may project not more than six inches (153 mm) below the required ceiling height.
2. All other rooms including kitchens, bathrooms and hallways shall have a minimum ceiling height of seven feet (2134 mm) measured to the lowest projection from the ceiling.
3. Habitable basements shall have a minimum clear ceiling height of seven feet zero inches, except that beams, girders and other obstructions spaced not less than four feet on center may project not more than six inches below the required ceiling height.
4. Basements not used for *habitable* spaces shall have a minimum clear ceiling height of six feet eight inches (2032 mm) except for under beams, girders, ducts or other obstructions where the clear height shall be a minimum of six feet four inches (1931 mm).

**3603.8.2 Height effect on room area:** Portions of a room with a sloping ceiling measuring less than five feet zero inches (1524 mm) or a *furred ceiling*

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measuring less than seven feet zero inches (2134 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required habitable area for that room.

**3603.8.3 Stairway ceiling height:** Stairway headroom clearances shall be in accordance with the provisions of 780 CMR 3603.13.3.

**780 CMR 3603.9 ACCESS TO CRAWL SPACES AND ATTICS**

**3603.9.1 Access to crawl spaces:** Access shall be provided to crawl spaces by an opening not less than 18 inches (457 mm) by 24 inches (610 mm).

**3603.9.2 Access to attics:** An opening not less than 22 inches by 30 inches (559 mm by 762 mm) with ready access thereto shall be provided to any attic area having a clear height of over 36 inches (914 mm). Where doors or other openings are installed in the draftstopping, such doors shall be self-closing and be of approved materials as specified in this section, and the construction shall be tightly fitted around all pipes, ducts or other assemblies piercing the draftstopping.

**780 CMR 3603.10 MEANS OF EGRESS**

**3603.10.1 Means of egress:** Egress from all dwelling units shall be by means of two exit doors, remote as possible from each other and leading directly to grade. Such doors shall be provided at the normal level of entry/exit. In addition, all other floors within a dwelling unit shall have at least one means by which a continuous and unobstructed path to the exit doors, by means of stairways, corridors, hallways or combinations thereof, is provided.

**Exception:** In split level and raised ranch style layouts, the two separate exit doors required by

780 CMR 3603.10.1 are permitted to be located on different levels.

**3603.10.2 Exit doors:** One of the required exit doors required by 780 CMR 3603.10.1 shall be a side-hinged swinging door. The second exit door may be provided by a side-hinged swinging door or sliding type doors. Side hinged swinging doors provided to meet this requirement may swing inward.

**3603.10.3 Door hardware:** Double cylinder dead bolts requiring a key operation on both sides are prohibited on required means of egress doors serving more than one dwelling unit.

**3603.10.4 Emergency egress from sleeping rooms:** Sleeping rooms shall have at least one openable window or exterior door approved for emergency egress or rescue in each such room. The units shall be operable from the inside to a full clear opening without the use of a key or tool. Emergency escape windows, under 780 CMR 3603.10.4, shall have a sill height of not more than 44 inches (1118 mm) above the floor.

**3603.10.4.1 Minimum size.** All emergency escape windows from sleeping rooms shall have a net clear opening of 3.3 square feet (0.307 m<sup>2</sup>). The minimum net clear opening shall be 20 inches by 24 inches in either direction.



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**Exception:** Windows in sleeping rooms of existing dwellings which do not conform to the requirements of 780 CMR 3603.10.4.1 may be replaced without conforming to 780 CMR 3603.10.4.1, provided that the replacement windows do not significantly reduce the existing opening size.

**3603.10.4.2 Bars, grills and screens:** Bars, grills, screens or other obstructions placed over emergency escape windows shall be releasable or removable from the inside without the use of a key or tool.

**3603.10.5 Exitway under stair protection:** Enclosed accessible space under stairs shall have walls and soffits protected on the enclosed side with ½-inch (12.7 mm) gypsum board.

## **780 CMR 3603.11 DOORS AND HALLWAYS**

**3603.11.1 Exit doors:** The minimum nominal width of at least one of the exit doors required by 780 CMR 3603.10.1 shall be 36 inches and the minimum nominal height shall be six feet eight inches. All other exit doors and doors leading to or from enclosed stairways, shall not be less than 32 inches in nominal width nor six feet eight inches in nominal height.

**Exceptions:**

1. Existing Buildings: New and replacement doors are permitted to be six feet six inches in nominal height.
2. Sliding type doors utilized as a second means of egress shall not be less than six feet six inches in nominal height.

**3603.11.2 Interior Doors:** All doors providing access to habitable rooms shall have a minimum nominal width of 30 inches and a minimum nominal height of six feet six inches.

**Exception:**

1. Doors providing access to bathrooms are permitted to be 28 inches in nominal width.
2. Existing Buildings: Doors providing access to bathrooms are permitted to be 24 inches in nominal width.

## **780 CMR 3603.12 LANDINGS**

**3603.12.1 General:** A minimum of three foot by three foot (914 mm by 914 mm) landing or open floor area shall be provided at the interior side of all exit doors. A minimum 48 inches wide by 42 inches deep landing shall be provided on the exterior side of all exit doors. The floor area or landing shall not be more than 1½ inches (38 mm) lower than the top of the threshold on the interior side, nor more than 8¼ inches lower than the threshold on the exterior side.

**Exceptions:**

1. At the top of a flight of interior stairs, on the stairway side, provided the door does not swing over the stairs.
2. For sliding type doors, or other doors where the threshold is located eight inches or less above the adjacent exterior finished grade.

## **780 CMR 3603.13 STAIRWAYS**

**3603.13.1 Width:** Stairways shall not be less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. The minimum width at and below the handrail height shall not be less than 32 inches (813 mm) where a handrail is installed on one side and 28 inches (711 mm) where handrails are provided on both sides.

**3603.13.2 Treads and risers:** The maximum riser height shall be 8¼ inches (210 mm) and the minimum tread depth shall be nine inches (229 mm). The riser height shall be measured vertically between leading edges of the adjacent treads. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The walking surface of treads and landings of a stairway shall be

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sloped no steeper than one unit vertical in 48 units horizontal (2% slope). The greatest riser height within any flight of stairs shall not exceed the smallest by more than  $\frac{1}{4}$  inch (9.5 mm) and any two successive risers shall not deviate by more than  $\frac{3}{16}$ -inch in height. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than  $\frac{1}{4}$  inch (9.5 mm) and any two successive treads shall not deviate in depth by more than  $\frac{3}{16}$ -inch.

**3603.13.2.1 Nosings:** Nosings shall not project more than  $1\frac{1}{2}$  inches beyond the face of the riser below.

**3603.13.3 Headroom:** The minimum headroom in all parts of the stairway shall not be less than six feet six inches (1981 mm) measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform.

**3603.13.4 Winders:** Winders are permitted, provided that the width of the tread at a point not more than 12 inches (305 mm) from the side where the treads are narrower is equal to the tread depth of the straight run portion of the stairs and the minimum width of any tread is not less than six inches (153 mm). The continuous handrail required by 780 CMR 3603.14.1 shall be located on the side where the tread is narrower.

**3603.13.5 Spiral stairs:** Spiral stairways are permitted, provided the minimum width shall be 26 inches (660 mm) with each tread having a  $7\frac{1}{2}$ -inch

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(190 mm) minimum tread width at 12 inches (305 mm) from the narrow edge. All treads shall be identical, and the rise shall be no more than 9½ inches (241 mm). A minimum headroom of six feet six inches (1982 mm) shall be provided.

**3603.13.6 Circular stairways:** Circular stairways shall have a minimum tread depth and a maximum riser height in accordance with 780 CMR 3603.13.2 and the smaller radius shall not be less than twice the width of the stairway. The minimum tread depth of ten inches (254 mm) shall be measured from the narrower end.

**3603.13.7 Illumination:** All stairways shall be provided with artificial illumination in accordance with 780 CMR 3603.6.1 (exception 2).

## 780 CMR 3603.14 HANDRAILS AND GUARDRAILS

### 3603.14.1 Handrails:

**3603.14.1.1 Handrails:** Handrails having minimum and maximum heights of 30 inches and 38 inches (762 mm and 965 mm), respectively, measured vertically from the nosing of the treads, shall be provided on at least one side of stairways of three or more risers. Spiral stairways shall have the required handrail located on the outside radius. All required handrails shall be continuous the full length of the stairs. Ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1½ inches (38 mm) between the wall and the handrail.

**Exceptions:**

1. Handrails shall be permitted to be interrupted by a newel post at a turn.
2. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.

**3603.14.1.2 Handrail grip size:** Stairway handrails shall have a circular cross section with an

outside diameter of at least 1¼ inches and not greater than two inches.

**Exceptions:**

1. Any other shape with a perimeter dimension of at least four inches but not greater than 6¼ inches (159 mm) with the largest cross-sectional dimension not exceeding 2½ inches.
2. Approved handrails of equivalent graspability.

### 3603.14.2 Guardrails:

**3603.14.2.1 Guardrail details:** Porches, balconies, decks or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guardrails not less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guardrails, which may also serve as handrails, not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

**3603.14.2.2 Guardrail opening limitations:** Required guardrails on open sides of stairways, balconies, porches, decks and raised floor areas, shall have intermediate rails, balusters or ornamental closures which prevent the passage of an object five inches (127 mm) or more in diameter.

**Exception:** Triangular spaces formed by the riser, tread and bottom rail of a guard at the open side of a stairway may be of sized to prevent the passage of a sphere six inches (153 mm) in diameter.

## 780 CMR 3603.15 RAMPS

**3603.15.1 Maximum slope:** All egress ramps shall have a maximum slope of one unit vertical in eight units horizontal (12.5% slope).

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**Exception 1:** The maximum slope of ramps for persons with disabilities shall be one unit vertical in 12 units horizontal.

**Exception 2:** Where access for persons with disabilities is legally mandated, ramps shall be constructed in accordance with the requirements of 521 CMR as listed in *Appendix A*.

**3603.15.2 Guardrails and handrails:** Guardrails shall be provided on both sides of all ramps and shall be constructed in accordance with 780 CMR 3603.14.2. Handrails conforming to 780 CMR 3603.14.1 shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal (8% slope).

**Exception 1:** For persons with disabilities, handrails shall be provided on both sides of the ramp when the vertical rise between landings exceeds six inches.

**Exception 2:** Where access for persons with disabilities is required by statute, ordinance or bylaw, guardrails and handrails shall be provided in accordance with the requirements of 521 CMR as listed in *Appendix A*.

**3603.15.3 Landing required:** A minimum three-foot-by-three-foot (914 mm by 914 mm) level landing shall be provided at the top and bottom of ramps where doors open onto the ramp and where the ramp changes direction.

**Exception 1:** Ramps required for persons with disabilities shall not have a vertical rise greater than 30 inches between landings.

**Exception 2:** Where access for persons with disabilities is legally mandated, landing requirements shall conform to the requirements of 521 CMR as listed in *Appendix A*.

**780 CMR 3603.16 FIRE PROTECTION SYSTEMS**

**3603.16.1 General:** All one and two family dwellings hereafter constructed shall be equipped with a *household fire warning system*, in accordance with the provisions of 780 CMR 3603.16. All devices shall be installed and maintained in accordance with the requirements of 780 CMR 3603.16, manufacturers instructions and listing criteria and otherwise shall be installed and maintained in accordance with Chapter 2 of NFPA 72 and 527 CMR 12.00 as listed in *Appendix A*.

**Exception:** In addition to the requirements of 780 CMR 3603.16.1, two family dwellings that contain common areas such as basements, hallways and/or interior stairways that serve both dwelling units, but are not within the dwelling units shall be provided with multiple station smoke detectors or a listed control unit with automatic smoke detectors and occupant notification appliances in the following locations.

1. In all common basements.
2. In all common hallways.
3. In all common stairways on each level outside the dwelling unit doorways.

Each detection device shall cause the operation of an alarm that is clearly audible in all bedrooms over background noise levels with all intervening doors closed. Such devices shall be installed in accordance with NFPA 72 and 527 CMR 12.00 as listed in *Appendix A*.

**3603.16.2 Compatibility:** All devices and/or combination of devices and equipment shall be approved and listed for the purposes for which such devices are to be utilized.

**3603.16.3 Smoke detectors:** All detached one- and two family buildings, including *manufactured homes* in accordance with 780 CMR 35, shall contain listed single and multiple station smoke detectors or other *household fire warning systems* in compliance with ANSI/UL 217 and/or ANSI/UL 268 (listed in Appendix A) and conforming to 780 CMR 3603.16;

*such household fire warning systems* shall be installed and maintained in accordance with the requirements of 780 CMR 3603.16, manufacturers instructions and listing criteria and otherwise shall be installed and maintained in accordance with Chapter 2 of NFPA 72 and 527 CMR 12.00 as listed in *Appendix A*.

**3603.16.4 Heat detectors:** (Reserved).

**3603.16.5 Primary electrical power for single station and multiple station smoke detectors:** Power for single and multiple station smoke detectors shall be supplied from a permanently wired connection directly to an AC primary source of power. All power for AC powered smoke detectors shall be taken from a single branch circuit which also provides other electrical service to *habitable, occupiable spaces*. The power source shall be on the supply side, ahead of any switches.

**3603.16.6 Primary electrical power for other household fire warning systems:** Low voltage *household fire warning systems* that include a listed control unit with automatic detectors and occupant notification appliances shall be powered from a permanently wired AC primary power source. Such AC primary power shall be supplied either from a dedicated branch circuit or the unswitched portion of a branch circuit also used for power and lighting of *habitable, occupiable spaces*, in accordance with the requirements of NFPA 72 and 527 CMR 12.00 as listed in *Appendix A*.

**3603.16.7 Secondary electrical power:** In addition to required primary power as discussed in 780 CMR 3603.16.5 and 780 CMR 3603.16.6, all household fire warning systems shall have secondary (standby) power supplied from monitored batteries in accordance with the household fire warning equipment requirements of NFPA-72 as listed in *Appendix A*.

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**3603.16.8 Required alarm notification appliances:**

Where more than one smoke or heat detector is required by 780 CMR 3603.16.10, all required detectors shall be installed so that the activation of any detector shall cause the alarm in all required smoke detectors in the dwelling unit to sound.

Detector activation in a dwelling unit shall not activate signals in any other dwelling unit or common areas.

**3603.16.9 Alarm signaling intensity:** All required alarm-sounding appliances shall have a minimum rating of 85 dBA at ten feet in accordance with the requirements of NFPA 72.

**Exception:** Sounding appliances directly located in bedrooms shall have a sound pressure level as low as 75 dBA at ten feet in accordance with the requirements of NFPA 72.

**3603.16.10 Required smoke detector/heat detector locations:** Smoke detectors shall be installed in the following locations:

1. In the immediate vicinity of bedrooms;
2. In all bedrooms;

3. In each story of a dwelling unit, including basements and cellars, but not including crawl spaces and uninhabitable attics;
4. In residential units of 1200 square feet or more, automatic fire detectors, in the form of smoke detectors shall be provided for each 1200 square feet of area or part thereof;
5. Fixed temperature heat detectors shall be installed in accordance with the requirements of 780 CMR 3603.16.4.

**Exceptions:**

1. In dwelling units with one or more split levels, (i.e., adjacent levels with less than one full story separation between levels) a smoke detector installed on the upper level shall suffice for the adjacent lower level unless there is an intervening door between one level and the adjacent lower level in which case smoke detectors shall be installed on both levels.
2. In buildings equipped throughout with an automatic sprinkler system, smoke detectors are not required in bedrooms.

**3603.16.11 Photo electric smoke detector requirements:** Any smoke detector located within 20 feet of a kitchen or within 20 feet of a bathroom containing a tub or shower shall be a photo electric type smoke detector but shall satisfy the compatibility requirements of 780 CMR 3603.16.2.

**3603.16.12 Maintenance and testing:** It shall be the responsibility of the *owner* to properly maintain the household fire warning system in accordance with the requirements of NFPA 72 as listed in **Appendix A**.

**3603.16.13 Additions, alterations and repairs:** When one or more sleeping rooms are added or created in existing dwellings, the entire building shall be provided with smoke detectors designed and located as required for new dwellings.

For other alterations or repairs that would require a fire protection system in an existing building be upgraded, refer to 780 CMR 3404 and/or 780 CMR 3405, as applicable.

**780 CMR 3603.17 FOAM PLASTIC**

**3603.17.1 General:** The provisions of this section shall govern the requirements and uses of foam plastic insulation.

**3603.17.1.1 Surface burning characteristics:**

Except where otherwise noted in 780 CMR 3603.17.2, all foam plastic or foam plastic cores in manufactured assemblies used in building construction shall have a flame-spread rating of not more than 75 and shall have a smoke-developed rating of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E 84.

**3603.17.1.2 Thermal barrier:** Foam plastic, except where otherwise noted, shall be separated from the interior of a building by minimum ½-inch (12.7 mm) gypsum wallboard. The gypsum board shall be installed using a mechanical fastening system in accordance with 780 CMR 3607.2.3.5. Reliance on adhesives to ensure the gypsum wallboard will remain in place when exposed to fire shall be prohibited.

**3603.17.2 Specific requirements:** The following requirements shall apply to all uses of foam plastic unless specifically approved in accordance with 780 CMR 3603.17.3 or by other sections of 780 CMR.

**3603.17.2.1 Masonry or concrete construction:**

Foam plastics may be used without the thermal barrier described in 780 CMR 3603.17.1.2 when the foam plastic is protected by a minimum one-inch (25 mm) thickness of masonry or concrete.

**3603.17.2.2 Roofing:** Foam plastic may be used in a roof-covering assembly without the thermal barrier when the foam is separated from the interior of the building by plywood or wood structural panel sheathing in accordance with 780 CMR 3608.3, not less than <sup>15</sup>/<sub>32</sub> inch (12 mm) in thickness bonded with exterior glue and identified as Exposure 1, with edge supported by

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blocking or tongue-and-groove joints. The smoke-developed rating shall not be limited.

**3603.17.2.3 Attics:** Within an attic accessible by means of a fixed stairway, foam plastics shall be protected against ignition by 1½-inch-thick (38 mm) mineral fiber insulation, ¼-inch-thick (6.4 mm) wood structural panels, ½-inch (12.7 mm) particleboard, ¼-inch (6.4 mm) hardboard, or ½-inch (12.7 mm) gypsum wallboard, corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

**3603.17.2.4 Foam-filled doors:** Foam-filled doors are exempt from the requirements of 780 CMR 3603.17.

1. The minimum density is 20 pounds per cubic foot (3.14 kN/m<sup>3</sup>);
2. The maximum thickness of the trim is ½ inch (12.7 mm) and the maximum width is four inches (102 mm);
3. The trim constitutes no more than 10% of the area of any wall or ceiling, and
4. The flame-spread rating does not exceed 75 when tested per ASTM E 84. The smoke-developed rating is not limited.

**3603.17.3 Specific approval:** Plastic foam not meeting the requirements of 780 CMR 3603.17.1 and 3603.17.2 may be specifically approved on the basis of approved tests such as, but not limited to, a tunnel test in accordance with ASTM E 84, FM 4880, UL 1040, ASTM E 152, or UL 1715, or fire tests related to actual end-use configurations. The specific approval may be based on the end use, quantity, location and similar considerations where such tests would not be applicable or practical.

**3603.17.4 Interior finish:** Foam plastics which are used as interior finish shall also meet the flame-spread requirements for interior finish.

## 780 CMR 3603.18 INTERIOR FINISH REQUIREMENTS/FLAME SPREAD AND SMOKE DEVELOPED

**3603.17.2.5 Siding backer board:** Foam plastic board of not more than ½-inch (12.7 mm) thickness may be used as siding backer board when separated from interior spaces by not less than two inches (51 mm) of mineral fiber insulation or ½-inch (12.7 mm) gypsum wallboard or installed over existing exterior wall finish in conjunction with re-siding, providing the plastic board does not have a potential heat of more than 2,000 Btu per square foot (22 720 kJ/m<sup>2</sup>) when tested in accordance with NFPA 259.

**3603.17.2.6 Interior trim:** Foam plastic trim defined as picture molds, chair rails, baseboards, handrails, ceiling beams, door trim and window trim may be installed, provided:

**3603.18.1 Wall and ceiling:** Wall and ceiling finishes shall have a flame-spread classification of not greater than 200.

**Exception:** Flame-spread requirements for finishes shall not apply to trim defined as picture molds, chair rails, baseboards and handrails; to doors and windows or their frames; or to materials which are less than 1/28 inch (0.907 mm) in thickness cemented to the surface of walls or ceilings if these materials have a flame-spread characteristic no greater than paper of this thickness cemented to a noncombustible backing.

**3603.18.2 Smoke density:** The smoke density shall not be greater than 450.

**3603.18.3 Testing.** Tests shall be made in accordance with ASTM E 84.

## 780 CMR 3603.19 INSULATION/FLAME SPREAD, SMOKE DEVELOPED/CRITICAL RADIANT FLUX

**3603.19.1 Insulation:** All exposed insulation materials, including facings, such as vapor barriers or breather papers installed within floor-ceiling



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assemblies, roof-ceiling assemblies, wall assemblies, crawl spaces and attics shall have a flame-spread rating not to exceed 25 with an accompanying smoke developed factor not to exceed 450 when tested in accordance with ASTM E 84.

**Exception:** When such materials are installed in concealed spaces, the flame-spread and smoke-development limitations do not apply to the facings, provided that the facing is installed in substantial contact with the unexposed surface of the ceiling, floor or wall finish.

**3603.19.2 Loose-fill insulation:** Loose-fill insulation-materials which cannot be mounted in the ASTM E 84 apparatus without a screen or artificial supports shall have a flame-spread rating not to exceed 25 with an accompanying smoke-developed factor not to exceed 450 when tested in accordance with CAN4-S102.2-M83.

**3603.19.3 Exposed attic insulation:** All exposed insulation materials installed on attic floors shall have a critical radiant flux not less than 0.12 watt per square centimeter.

**3603.19.4 Testing:** Tests for critical radiant flux shall be made in accordance with ASTM E 970.

## 780 CMR 3603.20 GLAZING

**3603.20.1 Scope:** The provisions of 780 CMR 3603.20 and 780 CMR 24 shall govern the materials,

**3603.20.3 Louvered windows or jalousies:** Regular, float, wired or patterned glass in jalousies and louvered windows shall be no thinner than nominal 3/16 inch (4.76 mm) and no longer than 48 inches (1219 mm). Exposed glass edges shall be smooth. Wired glass with wire exposed on longitudinal edges shall not be used in jalousies or louvered windows.

### 3603.20.4 Safety glazing:

**3603.20.4.1 Human impact loads:** Individual glazed areas, including glass mirrors, in hazardous

design, construction and quality of glass and glazing in vertical and sloped applications. For the definition of approved light-transmitting plastic, see 780 CMR 2604.1. ***Safety glazing materials shall conform to the requirements of M.G.L. c. 143, §§ 3T, 3U, and 3V, and CPSC 16 CFR; 1201, as applicable.***

**3603.20.2 Marking:** Each light shall bear the manufacturer's **mark** designating the type and thickness of glass. Labels may be omitted from other than safety glazing materials unless specifically required by the building official. Safety glazing shall be marked in accordance with 780 CMR 3603.20.1 ***and shall conform to the requirements of M.G.L. c. 143, §§ 3T, 3U, and 3V.*** The mark shall not be omitted from tempered glass. Each unit of tempered glass shall be permanently identified by the manufacturer's mark. The identifying mark shall be etched or ceramic fired on the glass and shall be visible when the unit is glazed.

**3603.20.2.1 Identification:** To qualify as glass with special performance characteristics, each unit of laminated, heat-strengthened, tempered glass shall be permanently identified by the manufacturer. The identification of tempered glass shall be etched or ceramic fired on the glass and be visible when the unit is glazed. Heat-strengthened and tempered spandrel glasses are exempted from permanent labeling. This type of glass shall be labeled with a removable paper label by the manufacturer.

locations such as those indicated in 780 CMR 2405.2 shall pass the test requirements of CPSC 16 CFR; 1201 ***and shall conform to the requirements of M.G.L. c. 143, §§ 3T, 3U and 3V, as applicable,*** listed in ***Appendix A.*** The requirements of this section and 780 CMR 2405.2 and 2407.0 shall apply equally to replacement glass and new glass installation. Additional requirements as specified in 780 CMR 2407.2 are to be satisfied for glass used in locations where the hazard is of a continuous nature, such as glass enclosures for sporting activities as identified in 780 CMR.

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**Exceptions:**

1. Polished wired glass used in required fire resistance rated assemblies *or polished wire glass used in hazardous locations such as those indicated in 780 CMR 3603.20.4.2, items 6,7,8 and 9* shall comply with ANSI Z97.1, listed in *Appendix A*.
2. Plastic glazing shall meet the weathering requirements of ANSI Z97.1 listed in *Appendix A*.
3. Glass-block walls shall comply with 780 CMR 2115.0.

**3603.20.4.1.1 Identification:** Each light of safety glazing material installed in hazardous locations as defined in 780 CMR 3603.20.4.2 shall bear a permanent identifying mark issued by an approved agency which specifies the marking agency, whether manufacturer or installer, and the test standard.

**Exceptions:**

1. *Polished wire glass is exempt from a permanent identifying mark provided that the distributor or the installer provides an affidavit certifying that the polished wire glass complies with ANSI Z97.1 listed in Appendix A.*
2. *Laminated glass is exempt from a permanent identifying mark provided that the distributor or installer provides an affidavit certifying that the laminated glass complies with CPSC 16 CFR 1201, listed in Appendix A.*

**3603.20.4.2 Specific hazardous locations:** The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in ingress and means of egress doors except jalousies (see 780 CMR 2402.5).
2. Glazing in fixed and sliding panels of sliding (patio) door assemblies and panels in swinging doors.
3. Glazing in storm doors.

4. Glazing in all unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1525 mm) above a standing surface.
6. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches (1525 mm) above the walking surface.
7. Glazing in an individual fixed or operable panel, other than in those locations described in 780 CMR 3603.20.4.2 items 5. and 6., which meets all of the following conditions:
  - a. Exposed area of an individual pane greater than nine square feet (0.84 m<sup>2</sup>);
  - b. Exposed bottom edge less than 18 inches (460 mm) above the floor;
  - c. Exposed top edge greater than 36 inches (915 mm) above the floor; and
  - d. One or more walking surface(s) within 36 inches (915 mm) horizontally of the plane of the glazing.
8. All glazing in guards and railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural in-fill panels.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools where the bottom edge of the glazing on the pool side is less than 60 inches (1525 mm) above a walking surface and within 36 inches (914 mm) horizontally of a walking surface. This shall apply to single glazing and all panes in multiple glazing.

**Exception:** The following products, materials and uses shall not be considered specific hazardous locations:

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1. Glazed openings in doors through which a three-inch (76 mm) sphere is unable to pass.
2. Assemblies of leaded glass or faceted glass and items of carved glass used for decorative purposes in locations described in 780 CMR 3603.20.4.2, items 1., 6. or 7.

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3. Glazing as described in 780 CMR 3603.20.4.2, item 6., where there is an intervening wall or some other permanent barrier that will prevent a person approaching the door from accidentally striking the glazing.

4. Glazing as described in 780 CMR 3603.20.4.2, item 7., where a protective bar is installed 34 inches to 38 inches (864 mm to 965 mm) above the floor on the side of the glazing having access thereto. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in height. *The protective bar may be an applied bar or an integral part of the glazed framing dividing an upper lite from a lower lite.*

5. Outboard panes in insulating glass units and other multiple-glazed panels as described in 780 CMR 3603.20.4.2, item 7., where the bottom exposed edge of the glass is 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) surface adjacent to the glass exterior.

6. Louvered windows and jalousies complying with the requirements of 780 CMR 3603.20.3.

7. Glazing, including mirrors, mounted or hung on a surface that provides a continuous backing support.

### 3603.20.5 Sloped glazing and skylights

**Note:** Also refer to 780 CMR 2404.0 and 2405.0.

**3603.20.5.1 Sloped glazing:** Any installation of glass or other transparent, translucent or opaque glazing material which is installed at a slope of 15 degrees (0.26 rad) or more from the vertical plane—including skylights, roofs and sloped walls—shall comply with 780 CMR 3603.20.5.

**3603.20.5.2 Allowable glazing materials:** Sloped glazing shall be any of the following materials, subject to the limitations specified in 780 CMR 3603.20.5.3 and the exceptions specified in 780 CMR 3603.20.5.4:

1. For monolithic glazing systems, the glazing material of the single light or layer shall be laminated glass with a minimum 30-mil (762 µm) polyvinyl butyral interlayer, wired glass, approved plastic materials, heat-strengthened glass or fully tempered glass.
2. For multiple-layer glazing systems, each light or layer shall consist of any of the glazing materials specified in 780 CMR 3603.20.5.2, item 1.

For additional requirements for plastic skylights, see 780 CMR 2608.0.

**3603.20.5.3 Limitations:** Where used in monolithic glazing systems, heat-strengthened glass and fully tempered glass shall have screens installed below the glazing material, subject to the exceptions in 780 CMR 3603.20.5.4, to protect building occupants from falling glass should breakage occur. The screens shall be capable of supporting the weight of the glass and shall be substantially supported below and installed within four inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B & S Gage (0.0808 inch) with a mesh not larger than one inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent non-corrosive atmosphere, structurally equivalent non-corrosive screening materials shall be used. Where used in multiple-layer glazing systems as the bottom glass layer over the walking surface, heat-strengthened glass, fully tempered glass and wired glass shall be equipped with screening that conforms to the requirements specified for monolithic glazing systems.

**3603.20.5.4 Exceptions:** In monolithic and multiple-layer sloped glazing systems, the following exceptions apply:

1. Fully tempered glass installed without protective screens where glazed between

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intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane shall have the highest point of the glass ten feet (3048 mm) or less above the walking surface.

2. Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.

3. Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of detached greenhouses, provided that the height of the greenhouse at the ridge does not exceed 20 feet (6096 mm) above grade. Greenhouse

**3603.20.5.5 Curbs for skylights.** All unit skylights installed in a roof with a pitch flatter than three units vertical in 12 units horizontal (25% slope) shall be mounted on a curb extending at least four inches (102 mm) above the plane of the roof.

## 780 CMR 3603.21 ENERGY CONSERVATION REQUIREMENTS

**3603.21.1 General:** All one and two family detached buildings shall comply with the comprehensive energy requirements set forth in 780 CMR *Appendix J*.

## 780 CMR 3603.22 PROTECTION AGAINST DECAY AND TERMITES

**3603.22.1 Required Protection:** Where protection of wood members is required by 780 CMR 3603.22, protection shall be provided against decay or termite damage by the use of naturally durable or preservative-treated wood as required by 780 CMR 3603.22.

**3603.22.2 Naturally durable wood:** The term "naturally durable wood" refers to the heartwood of the following species with the exception that an

frames shall be noncombustible if the height of the sloped glazing exceeds 20 feet (6096 mm) above grade.

4. Screens shall not be required where fully tempered glass *or laminated glass with a 15 mil polyvinyl butyral interlayer* is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:

- Each pane of glass is 16 square feet (1.5 m<sup>2</sup>) or less in area;
- The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other area having access thereto; and
- The glass thickness is <sup>3</sup>/<sub>16</sub> inch (5 mm) or less.

occasional piece with corner sapwood is permitted if 90% or more of the width of each side on which it occurs is heartwood

**Decay resistant:** Redwood, cedar, black locust and black walnut.

**Termite resistant:** Redwood and Eastern red cedar

## 3603.22.3 Preservative-treated wood:

**3603.22.3.1 Preservative-treated wood:** The term "preservative-treated wood" refers to wood (including plywood) pressure treated with preservatives, that conforms to retention, penetration and other requirements applicable to the species, product, treatment and conditions of use in AWPAC1, C2, C9, C15, C18, C20, C22, C23, C24, C27 and C28 listed in *Appendix A*. Preservatives shall conform to AWPAC1/P13, P2, P5, P8 and P9 listed in *Appendix A*. Lumber and plywood in wood foundation systems shall conform to 780 CMR 1808.3.

**3603.22.3.2 Identification:** All piles, poles, lumber and plywood which are required to be preservative-treated shall bear the quality mark of an approved agency that maintains continuing supervision, testing and inspection over the quality of the product. Quality-control inspection

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agencies for preservative-treated wood shall be certified as to competency and performance by an approved organization. Said mark shall include the following information in a legible format: identification of the inspection agency; the standard to which the product is treated; the identification of the treating plant; and the purpose for which the product has been treated. The mark shall be permanently affixed to each piece unless specifically waived by the building official.

**3603.22.3.3 Moisture content:** Where wood that is pressure treated with a water-borne preservative is used in enclosed locations where drying in service cannot readily occur, such wood shall be at a moisture content of 19% or less before being covered with insulation, interior wall finish, floor covering or other material.

**3603.22.3.4 Fasteners:** Fasteners for preservative-treated wood shall be of hot-dipped, zinc-coated, galvanized stainless steel, silicon bronze, copper or other corrosion-resistant materials. Fasteners for wood foundations shall be as required in AFPA TR7 listed in *Appendix A*.

**3603.22.4 Wood used above ground:** Wood installed above ground in the locations specified in 780 CMR 3603.22.4.1 through 3603.22.4.6 shall be naturally durable wood or preservative-treated wood treated by water-borne preservatives, and shall be treated in accordance with AWPAC2 or C9 listed in *Appendix A* for above-ground use.

**3603.22.4.6 Posts or columns:** Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing which is in direct contact with the earth shall be of approved naturally durable or preservative-treated wood

**Exceptions:**

1. Posts or columns which are either exposed to the weather or located in basements or cellars, supported by concrete piers or metal pedestals projecting at least one inch (25 mm)

**3603.22.4.1 Joists and girders:** Where wood joists or the bottom of a wood structural floor without joists are closer than 18 inches (457 mm), or wood girders are closer than 12 inches (305 mm), to the exposed ground in crawl spaces or unexcavated areas located within the perimeter of the building foundation, the floor assembly (including posts, girders, joists and subfloor) shall be of approved naturally durable or preservative-treated wood.

**3603.22.4.2 Framing:** All wood framing members, including wood sheathing, which rest on exterior foundation walls and are less than eight inches (203 mm) from exposed earth shall be of approved naturally durable or preservative-treated wood.

**3603.22.4.3 Sleepers and sills:** Sleepers and sills on a concrete or masonry slab which is in direct contact with earth shall be of approved naturally durable or preservative-treated wood.

**3603.22.4.4 Girder ends:** The ends of wood girders entering exterior masonry or concrete walls shall be provided with a 1/2-inch (13 mm) air space on top, sides and end, unless approved naturally durable or preservative-treated wood is used.

**3603.22.4.5 Clearance:** Clearance between wood siding and earth on the exterior of a building shall not be less than six inches (152 mm) except where siding, sheathing and wall framing are of approved preservative-treated wood.

above the slab or deck and six inches (152 mm) above exposed earth, and are separated therefrom by an impervious moisture barrier.

2. Posts or columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building, supported by a concrete pier or metal pedestal at a height greater than eight inches (203 mm) from exposed ground, and are separated therefrom by an impervious moisture barrier.

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**3603.22.5 Wood in contact with the ground:** All wood in contact with the ground (exposed earth) which supports permanent structures that are intended for human occupancy, shall be of approved naturally durable or preservative-treated wood using water-borne preservatives and shall be treated in accordance with AWPA C2 or C9 listed in *Appendix A* for ground contact, where used in the locations specified in 780 CMR 3603.22.5.1 and 3603.22.5.2.

**Exception:** Untreated wood is permitted where such wood is entirely below the ground water level or where continuously submerged in fresh water.

**3603.22.5.1 Posts or columns:** Sawn posts and columns supporting permanent structures that are intended for human occupancy and which are embedded in concrete in direct contact with the earth or embedded in concrete exposed to the weather, or in direct contact with the earth, shall be of approved preservative-treated wood.

**3603.22.5.2 Wood structural members:** Wood structural members that support moisture-permeable floors or roofs which are exposed to the weather-such as concrete or masonry slabs-shall be of approved naturally durable or preservative-treated wood unless separated from such floors or roofs by an impervious moisture barrier.

**3603.22.6 Exposed Structural Members:** Wood members which form the structural supports of buildings, balconies, porches, decks or similar permanent building appurtenances where such members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering to prevent moisture or water accumulation on the surface or at joints between members. Depending on local experience, such members include, but are not limited to, the following:

1. Horizontal members such as girders, joists and decking;
2. Vertical members such as posts, poles and columns; or

3. Both horizontal and vertical members.

**3603.22.7 Wood used in retaining walls:** Wood installed in retaining or crib walls shall be of approved preservative-treated wood treated in accordance with AWPA C2 or C9 listed in *Appendix A* for ground contact, except as indicated in 780 CMR 3603.22.7.1 through 2311.7.3.

**3603.22.7.1 Untreated wood:** Where the wall is not more than two feet (610 mm) in height and is separated from the lot line or a permanent building by a minimum distance equal to the height of the wall, the wall is permitted to be of untreated wood.

**3603.22.7.2 Naturally durable wood on the lot line:** Where a retaining wall or a crib wall is not more than two feet (610 mm) in height and is located on the lot line, approved naturally durable wood is permitted.

**3603.22.7.3 Naturally durable wood separated:** Where retaining wall or a crib wall is not more than four feet (1219 mm) in height and is separated from the lot line or a permanent building by a minimum distance equal to the height of the wall, approved naturally durable wood is permitted.

**780 CMR 3603.23 MANUFACTURED  
BUILDINGS AND MANUFACTURED  
HOUSING**

**3603.23.1 Scope:** *The design, manufacture, handling, storage, transportation, assembly, construction and/or installation of manufactured buildings and manufactured building components intended for installation in the Commonwealth of Massachusetts shall be in accordance with the provisions of 780 CMR 35. Manufactured buildings or manufactured building components shall not be installed in any jurisdiction of the Commonwealth of Massachusetts unless such manufactured buildings or manufactured building components have been approved and certified in*

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*accordance with 780 CMR 35, and the Rules and Regulations for Manufactured Buildings, Manufactured Building Components and 3603.23.2 Manufactured housing: When constructed in accordance with the Code of Federal Regulations (CFR) Title 24, Chapter XX - Office of Assistant Secretary for Housing - Federal Housing Commissioner, Department of Housing and Urban Development, Parts 3280, Manufactured home construction and safety standards, and 3282, Manufactured home procedural and enforcement regulations; manufactured housing shall be exempt from the provisions of 780 CMR 3603.23.*

*Exceptions:*

- 1. Foundations for manufactured housing shall conform to 780 CMR 1806.0;*
- 2. Additions, (when not a manufactured housing unit as defined herein) and site built modifications shall conform to applicable provisions of 780 CMR.*

**780 CMR 3603.24 SANITATION**

**3603.24.1 Plumbing and Sanitary Facilities:** Every dwelling unit shall be provided with plumbing and sanitary facilities as required by 248 CMR, the Massachusetts State Plumbing and Fuel Gas Code,

*Manufactured Housing, 780 CMR R3, as listed in Appendix A.*

105 CMR 410.000, the State Sanitary Code, listed in *Appendix A*. Water closets, baths, showers and bidets shall be located in rooms which provide privacy to the occupant.

**3603.24.2 Water supply to fixtures:** All plumbing fixtures shall be connected to an approved water supply, in accordance with 248 CMR as listed in *Appendix A*.

**3603.24.3 Wastewater:** Provision shall be made for disposal of wastewater in accordance with 248 CMR, as listed in *Appendix A*. Wastewater shall be discharged to a sanitary sewer or to an approved private sewage disposal system.

**780 CMR 3603.25 ELECTRICAL REQUIREMENTS**

**3603.25.1 General:** Every dwelling unit shall be provided with electrical facilities in accordance with the requirements of 527 CMR 12.00, the Massachusetts State Electrical Code as listed in *Appendix A*.



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